

PATENT
Attorney Docket No.: GRO-00100

REMARKS

This is a response to the Final Office Action dated August 22, 2003 in which it is stated within the Office Action that Claims 1-4, 14, 16, 17, 143 and 144 are currently pending. All claims stand rejected. The Applicants respectfully traverse.

Rejection Under 35 USC 102(b)

It is stated within the Office Action that the Claims 1, 2, 143 and 144 are anticipated by Massa. The Applicants respectfully disagree.

The present invention alters the effective coefficient of friction by inducing a repetitive motion in a first element against a second element, whereby the motion of the first element at the anti-nodal regions against the surface of the second element changes the effective coefficient of friction in between the two surfaces. The first element horizontally expands and contracts while it is energized and undergoes the repetitive motion. During expansion, the ends of the first element move away from the center, whereby the change in length causes the thickness of the nodal region of the first element to decrease in size. In contrast, during contraction, the ends move toward the center of the element, whereby the change in length causes the thickness of the nodal region of the first element to increase in size or 'bulge'. In other words, the change in horizontal length in the first element while energized causes the center of the first element to undergo a vertical dimension change. The center of the first element which undergoes vertical change is defined in the present specification as the nodal region. The anti-nodal region of the first element as defined in the present specification is where there is minimal vertical change.

Massa teaches a body employing high frequency compressional waves which reduces the amount of static friction between two smooth surfaces. Massa teaches that by using high frequency compressional waves, a high oscillatory velocity can be established between the two smooth mating pairs without the necessity of using large amplitudes. Massa also teaches imparting high velocity, low amplitude oscillatory vibrations at the interface of two mating smooth surfaces so that the static friction is greatly reduced while the resulting displacement produced at the interface is less than one tenth of a thousandth of an inch. As recognized in the Office Action, there is some vertical displacement onto the body in Massa from the bearing when the bearing is energized. Thus, Massa does not teach that only motion parallel to the interface is induced between the two surfaces. In addition, Massa does not teach using contact pads, nor does Massa teach that the interface between the sliding surfaces is only at the anti-nodal regions.

Contracted preload system - vertical movement

PATENT
Attorney Docket No.: GRO-00100

The present invention is distinguishable from Massa, because the sliding member in the present invention is only in contact with the anti-nodal regions of the bearing element. Thus, the sliding member does not substantially experience any vertical motion, but substantially experiences only horizontal motion, from the repetitive motion of the bearing. In contrast, as confirmed by Sase and Kutomii, the sliding body 2 in Massa experiences displacement of the bearing 1 in the vertical direction as well as the horizontal direction due to expansion and contraction of the bearing 1. This vertical displacement in the bearing 1 thus creates a change in the force holding the body 2 to the bearing 1 and, in some cases, attempts to push or "bump" the bottom surface of the sliding body 2 off the top surface of the bearing 1. Since at least a change in force holding the body 2 to the bearing 1 can be created due to the high frequency of "bumps," the actual static friction between the two objects decreases, which is quite different from the present invention.

The Applicants had elected sub species II A2 which corresponds to Figure 7A in response to the restriction requirement. However, as stated above, the present invention alters the effective coefficient of friction by configuring the two elements such that no motion perpendicular to the load surface is imparted onto the load surface. As previously explained, the bearing undergoes vertical displacement in the nodal region due to Poisson's ratio. Therefore, the present invention configures the interface to be a certain distance between the two surfaces such that nodal region of the bearing does not come into contact with the load surface. This is preferably done using contact pads or some other raised surface. Almost every figure in the present application illustrates this feature of the invention. In addition, it is stated numerous times in the present application that the motion parallel to the surfaces can only be imparted onto the load surface for the invention to operate properly. Therefore, this feature is inherent in Figure 7A in view of the discussion in the specification and thus, was elected in response to the Restriction Requirement dated March 6, 2002. Thus, to render amended Claims 1, 2, 143 and 144 as directed to a non-elected species is not correct.

Amended Claim 1 is directed to a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of: configuring the first and second surfaces to be in slidable contact with one another along an interface of a contact pad surface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween; and inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction along the contact pad surface. As stated above,

PATENT
Attorney Docket No.: GRO-00100

Massa does not teach that the interface is along a contact pad surface, whereby the repetitive motion is parallel to the interface. Instead, Massa teaches that the interface between the sliding surfaces are entirely in contact with one another. Also, as recognized in the Office Action, there are some vertical displacements upon the load surface in Massa. In addition, the limitation of the contact pad surface is within the election of species selected by the Applicants and is not an independent and distinct invention from sub-species II A2, because the contact pad surface prevents vertical motion from being imparted onto the second surface. For at least these reasons, amended Claim 1 is generic and within the elected species as well as distinguishable over Massa.

Amended Claim 2 is directed to a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of: configuring the first and second surfaces to be in slidable contact with one another along an interface of a contact pad surface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween; and inducing a symmetrical motion in the first surface parallel to the interface thereby altering the effective coefficient of friction along the contact pad surface. As stated above, Massa does not teach that the interface is along a contact pad surface, whereby the repetitive motion is parallel to the interface. Massa teaches that the interface between the sliding surfaces are entirely in contact with one another. Also, as recognized in the Office Action, there are some vertical displacements upon the load surface in Massa. Therefore, Massa does not teach a contact pad surface. In addition, the limitation of the contact pad surface is within the election of species selected by the Applicants and is not an independent and distinct invention from sub-species II A2, because the contact pad surface prevents vertical motion from being imparted onto the second surface. For at least these reasons, amended Claim 2 is distinguishable over Massa.

Claims 3, 4 and 14 were rejected under 35 U.S.C. 102(b) as being anticipated by Massa. However Claims 3, 4, and 14 are dependent on an allowable independent Claim 2. Accordingly, Claims 3, 4 and 14 are also in a condition for allowance.

Amended Claim 143 is directed to a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of: configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface, wherein the interface is located only along an anti-nodal region of the first element, the first and second surfaces under a force sufficient to maintain contact at the interface and having a static friction

PATENT
Attorney Docket No.: GRQ-00100

therebetween; and inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction. Within the Office Action, it is stated, "Note that the language of Claim 143 does not exclude the interface to be at the anti-nodal region and at areas surrounding the anti-nodal regions." In response to the note in the Office Action, the Applicants have amended Claims 143 to recite that the interface is located **only** at the anti-nodal region. As stated above, Massa does not teach that the interface is along only an anti-nodal region. Massa teaches that the interface between the sliding surfaces are entirely in contact with one another along the nodal and anti-nodal regions. In addition, the limitation of the interface being only at the anti-nodal region contact pad surface is within the election of species selected by the Applicants and is not an independent and distinct invention from sub-species IIA2, because the interface at the anti-nodal region allows the present invention to operate properly. For at least these reasons, amended Claim 143 is distinguishable over Massa.

Amended Claim 144 is directed to a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of: configuring the first and second surfaces to be in slidable contact with one another along an interface wherein the first surface protrudes from the first element an appropriate distance such that no motion perpendicular to the second surface is imparted to the second surface; and inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction, wherein the static friction force is unaltered. As stated above, Massa does not teach that the interface protrudes from the bearing a certain distance such that no motion that is perpendicular to the load surface is imparted to the load surface. Massa teaches that the interface between the sliding surfaces are entirely in contact with one another. Also, as recognized in the Office Action, there is some vertical displacement upon the load surface. In addition, the limitation of the interface being configured such that no perpendicular motion is imparted to the second surface is within the election of species selected by the Applicants for the reasons stated above and does not constitute a separate, independent and distinct invention from sub-species IIA2. For at least these reasons, amended Claim 144 is distinguishable over Massa.

Rejection Under 35 U.S.C. 103(a)

Claims 16 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Massa in view of Kamigaito et al. However Claims 16 and 17 are dependent on an allowable

PATENT
Attorney Docket No.: GRQ-00100

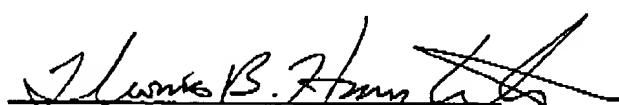
independent Claim 2. Accordingly, Claims 16 and 17 are also in a condition for allowance.

The Applicants respectfully submit that the claims are now in a condition for allowance in light of the above arguments, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, she is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 10-22-03

By:



Thomas B. Haverstock
Reg. No.: 32,571
Attorneys for Applicants

RECEIVED
CENTRAL FAX CENTER
OCT 22 2003

OFFICIAL

CERTIFICATE OF FACSIMILE TRANSMISSION	
I hereby certify that this paper (along with any referred to as being attached or enclosed) is being facsimile transmitted to the Patent and Trademark Office at	
<u>703 872 9306</u>	
on the date shown below.	
HAVERSTOCK & OWENS LLP	
Date: <u>10-22-03</u>	By: 